

REMARKS

By this Amendment, claims 1 & 9 have been amended and claim 8 has been canceled. In view of the above amendments and the following remarks further consideration of this application is respectfully requested.

In the preceding Office Action claims 1-4, 6, 7, 10, 13, 14, 17, 19 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,047,074 to Zoels et al. (hereinafter "Zoels") in view of U.S. Patent No. 5,884,260 to Leonhard (hereinafter "Leonhard"), claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Zoels in view of Leonhard and further in view of the article by Markowitz (hereinafter "Markowitz"), claims 8 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Zoels and Leonhard and further in view of U.S. Patent No. 5,933, 085 to Boss et al. (hereinafter "Boss"), claims 11, 12 and 15 under 35 U.S.C. § 103(a) as unpatentable over Zoels in view of Leonhard and further in view of well known prior art, and claims 16 and 18 under 35 U.S.C. § 103(a) as unpatentable over Zoels in view of Leonhard and further in view of U.S. Patent No. 5,608,803 to Magotra et al. (hereinafter "Magotra"). In view of the amendments above and the comments to follow, reconsideration and withdrawal of these rejections are respectfully requested.

Amended claim 1 recites, *inter alia*, at least one acoustic sensor, located upstream of analog-digital converters, for picking up an acoustic signal for converting it into electrical audio signals, an electronic signal processing unit for audio signal processing and amplifying said electrical audio signals, an electrical power supply unit which supplies individual components of the system with current, and *an actuator arrangement which is configured for positioning in a single external auditory passage* with at least one output actuator selected from the group consisting of electroacoustic, electromechanical, and purely electrical actuators, and any combination thereof, for stimulation of damaged hearing based on the electrical audio signals processed in the electronic signal processing unit, wherein the signal processing unit has a speech analysis and recognition module and *a speech synthesis module for facilitating the transmission of speech information in a noisy environment*, wherein the speech analysis and recognition module has *an arrangement for detecting and extracting additional prosody of the speech information*, and wherein the speech synthesis module is provided with *an arrangement for taking into account the prosody of speech information in*

speech synthesis. Applicants respectfully submit that the Zoels, Leonhardt, Boss and Magotra do not teach or suggest the combination of features set forth in amended claim 1.

Zoels is directed toward a programmable hearing aid operable in a mode for tinnitus therapy by improving the delivery of masking noise. Leonhard is directed to a method and system for detecting and generating transient conditions in auditory signals, and is not directed to the field of hearing aid construction, but rather is to performing quality measurement of hearing aids and various other acoustic systems; see, column 1, lines 8-13. In particular, as recited in the Abstract of Leonhard, "the invention further relates to a system for processing an auditory signal in order to reduce the bandwidth of the signal with substantial retention of the information of the signal, the system comprising means for extracting *the transient component* of the auditory signal, and means for detecting an envelope of *the transient component*." Boss is concerned with providing a compact representation of a speech signal for transmission and reproduction, and like Leonhard is not directed to the field of hearing aids.

The Magotra patent (which was not used by the examiner in support of his rejection of claim 8 that has now been incorporated into claim 1), discloses a programmable digital hearing aid, merely provides a "left microphone" and a "right microphone" for the left and right ear of a user (see FIG. 1, for example). Throughout the specification, Magotra describes a system that in which, a left and right microphone, respectively are input to a left signal processor 2 and a right signal processor 3 for output to an earphone having left and right speakers. On the other hand, the present invention includes "an actuator arrangement configured for positioning in a single external auditory passage which is provided with at least one output actuator...for stimulation of damaged hearing based on the electrical audio signal processed in the electronic signal processing unit" (emphasis added). Moreover, the present invention also now requires that "the signal processing unit has a speech analysis and recognition module and a speech synthesis module for facilitating transmission of speech information in a noisy environment" and moreover, the speech analysis and recognition module has *an arrangement for detecting and extracting additional prosody of the speech information*, and wherein the speech synthesis module is provided with *an arrangement for taking into account the prosody* [i.e., the rhythmic and intonational aspect of language] *of speech information in speech synthesis.*

It is submitted that no motivation can be seen for the person of ordinary skill in the art (POSA) to combine the references as proposed by the Examiner. For example, Zoels presumes the patient only suffers from conductive hearing loss, whereas the present invention recognizes a problem that is particularly problematic for cochlear implant patients, who suffer from sensory neural hearing loss. Clearly, Zoels is restricted to the relatively narrow field of tinnitus treating hearing aids, in comparison with the present invention recognizes the need for solutions for those having much broader, or different reasons underlying the hearing loss. Even if the POSA had regarded the specialized teachings of Zoels as being directly relevant to the problem at hand, Leonard would not be a document that would reasonably be looked to for modification of Zoels' hearing. Leonard envisages many different purposes for his transient analysis technique, which is an improvement of earlier speech analysis techniques. The problems in each of the Zoels and Leonard are disparate and there is simply no reason, apart from hindsight, to believe that the person of ordinary skilled in the art would think to combine isolated features from each of these documents to arrive at the present invention.

The present invention is concerned with the problem that speech understanding in noisy environments is greatly reduced (see, paragraph [0020]), with patients using new approaches to "replacing" the damaged cochlear amplifier (see, paragraph [0019]). The motivations of the POSA would be to look for solutions in the field of cochlear implants, for example, and not in the literature for improving tinnitus masking and/or improving existing speech analysis techniques. To do so presumes that the POSA already had knowledge of the solution proposed by the present applicants, a fact totally absent from the record. The same can also be said of Boss, which is directed to improving existing computing applications that require both speech analysis and speech synthesis, such as the Internet telephone example described by Boss.

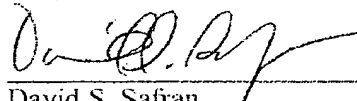
Applicants respectfully submit that none of the Zoels, Leonhardt, Boss and Magotra references disclose or even suggest such a hearing aid system for facilitating the transmission speech information in a noisy environment by synthesizing speech with a speech synthesis module that also has an arrangement for taking into account the prosody of speech information in speech synthesis. The Examiner has admitted in the rejection of item 4 on page 8 of his Action that the combination of Leonhardt and Zoels does not teach the use of a

speech analysis and recognition module with such an arrangement. For this purpose the Examiner has place reliance on Boss; however, as pointed out above, Boss does not relate to the field of hearing aids, no does this patent disclose anything which would suggest applicability of its disclosure to correction of hearing impairment. Thus, the Examiner's assertion that Boss is from the same field of endeavor is incorrect. The hearing systems of Leonhard and Zoels are not playback systems and are unrelated to such systems as are used for Internet telephony. The applied references are not directed to the same problem as the present applicants (speech recognition in a noisy environment) nor are they directed to applicants' solution to this problem (synthesizing instead of reproducing sound in a hearing aid).

Accordingly, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections.

Applicant respectfully submits that the application is now in condition for allowance and action to that effect is hereby requested. However, should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,



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